



Focus

Agricultural Burning Reducing Smoke

Here are some ideas for reducing smoke when you must burn. Some of these ideas come from California's Air Resources Board. Remember, you are responsible for both air pollution and fire safety on your land.

For a cleaner fire, burn HOT!

Combustion occurs when oxygen joins quickly with other substances, producing flames, heat, carbon dioxide, and water vapor. The three conditions needed to start and maintain a fire are:

- **Fuel:** A substance usually containing carbon-hydrogen compounds, which will burn. Agricultural waste is a solid fuel, ranging from light straw to dense wood, containing varying amounts of minerals (which produce ash upon burning) and moisture.
- **Kindling temperature:** The temperature to which a fuel must be heated to catch fire. Wood ignites at temperatures between 375 and 510 degrees Fahrenheit. Any moisture in or on the fuel will have to be boiled off (at 212 degrees Fahrenheit, or less for volatile plant sap) before the fuel can get hot enough to burn well. Burning at low temperatures creates smoke. Smoke is simply the result of incomplete combustion.
- **Oxygen:** Not all fuels burn the same way, but all require plenty of oxygen. Smaller pieces of fuel will burn more easily and quickly than large chunks because more fuel surface area is available to interact with oxygen. Carbon monoxide, volatile organic compounds, and soot particles are produced when oxygen is insufficient.

Don't leave your fire unattended. In addition to an unattended fire creating a potential runaway fire hazard, you need to be on hand to maintain a hot fire. Once the fire is started, feed continuously, as fast as the fire will consume the fuel.

Field crop burning

Recommended field crop drying times

This depends on the crop and the fuel moisture. For example, for some crops in California, three days drying time is required for "spread" straw and 10 days is required for "rowed" straw. In general, try the "crackle test:" if the straw makes an audible crackle when it is bent sharply, it is dry enough to burn. Several straw samples should be tested, including some from under the mat, in the center of the mat, and from several places in the field.

Field crop igniting techniques

Use an ignition device that does not produce black smoke, such as butane, propane, LPG, or diesel oil burners. A burning tire is not an appropriate ignition device. In fact, it is illegal to burn tires outdoors for any reason.

August 1998

Light a test fire. See how well the waste material burns and where the smoke is going. Quit if the fuel is too damp or smoke is blowing toward populated areas.

Light the downwind side of the field. The fire burns slower, but more thoroughly. It produces less particles and doesn't leave behind as many smoldering, smoky patches. In some areas of California, for example, cereal grain fields are to be ignited ONLY by "stripfiring" in the wind or by "backfiring." Stripfiring is lighting the field in strips by walking straight through the field INTO the wind. Backfiring is lighting the downwind edge of the field, so that the fire must creep into the wind.

For ditch and weed burning, kill the grass or weeds first and allow them to dry. Burn wastes using field crop igniting techniques. (Of course, never burn materials that are prohibited by law. Only dried vegetative debris is allowed to be burned.)

Orchard and vine crop burning

Recommended orchard and vine crop drying times

For prunings and small branches, three weeks is recommended for drying. For large branches and stumps, six weeks is recommended. In wet climates, more time is needed.

Orchard and vine crop igniting techniques

Stack your starter pile of brush and wood as tightly as possible, but make sure it has enough air circulating throughout. Parallel piling is best. Ignite by using a propane torch or another commercial lighting device that will raise a large area of the fuel pile to combustion temperature. Add fuel after your starter pile is fully engulfed. Avoid pushing dirt into the pile with the prunings. Don't make the pile too large. Remember, don't use tires or pour diesel oil on the fire to ignite! Both are illegal.

For more information

For more information about minimizing smoke production, contact:

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If you have special accommodation needs or require this document in alternative format, please call Tami Dahlgren at (360) 407-6830 (voice) or call (360) 407-6006 (TDD only).